

**MISSISSIPPI FORESTRY COMMISSION
660 NORTH STREET, SUITE 300
JACKSON, MS 39202
JANUARY 2016**

RFX # 3160000784

NOTICE

Sealed bids will be received by the Mississippi Forestry Commission in its offices at 660 North Street Suite 300, Jackson, MS 39202, until 2:00 o'clock p.m. on January 26, 2016, and shortly thereafter, publicly opened for purchase of:

**FOURTEEN (14) ONE HUNDRED FOUR HORSEPOWER (104 HP) LPG CLASS
BULLDOZER with BLADE**

Under existing conditions, the Mississippi Forestry Commission will not accept bids that do not contain a firm stated price without any reservation as to price increase of any kind after date of contract. Firm delivery dates shall be included in the bid. The Mississippi Forestry Commission reserves the right to reject any/or all bids. **All bids received after the deadline will be returned unopened.**

Address an envelope as follows:

Mississippi Forestry Commission
660 North Street, Suite 300
Jackson, MS 39202
Attn: Purchasing Department

In the lower left-hand corner, write: **"104 HP LPG CLASS BULLDOZER"** to be opened on January 26, 2016.

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**SPECIFICATIONS
ENVIRONMENTAL CAB CRAWLER TRACTOR WITH BLADE,
MINIMUM 104 NET HP, JOHN DEERE 650K LGP, CAT D5K2 LGP OR APPROVED
EQUIVALENT**

SCOPE

The intent of this specification is to define a crawler tractor for use in a severe forestry environment. The primary use being wildfire suppression and fuel mitigation projects in extremely heavy forest fuels. The tractor must have the ability to perform continuous drawbar work over long periods of time in extremely adverse conditions. The tractor must be able to pull a variety of rear attachments, or bulldoze firelanes without overheating or otherwise malfunctioning. Product support must be readily available throughout the state of Mississippi. The Manufacturer, or dealer, must guarantee parts availability according to the following general guidelines: 1) Parts for normal maintenance or minor repairs, must be available the same day or within 24 hours; 2) Major components such as engines, transmissions, hydraulic pumps and motors, etc., must be available within 72 hours; and 3) Large components such as cabs, ROPS, main frames, roller frames, etc., must be available within 2-3 weeks. The unit must be new, unused and be prepared for service when delivered to the specified location.

10. PERFORMANCE

- A. Top speed at full throttle on cleared; level ground must be a minimum of 6.0 MPH.
- B. Drawbar/sprocket pull minimum 9000lbs at 3.0 mph
- C. Machines must be able to perform draw bar operation during the hottest days of the year **without** overheating.

20. ENGINE

- A. Engine must be a current production crawler tractor engine offered by the manufacturer. Prototype or experimental engines are not acceptable.
- B. Engine must be diesel fueled, turbocharged, four-stroke cycle, liquid cooled minimum 104 net HP, per the latest issue of SAE J1349.
- C. Displacement must be a minimum of 4.4 liters.

- D. Fan may be blower or suction type. Finger guard required.
- E. Radiator must be suitable for forestry application. Fin spacing shall be no closer than ten (10) fins per inch. Bar and plate construction. Sand screens are not acceptable. Maximum cooling capacity shall be provided. Cooling system shall be filled with coolant that provides freeze protection to -30 degrees F and maximum corrosion protection.
- F. Air cleaner shall be dry type with safety element and pre-screener. A perforated guard that serves as prescreener shall protect intake cover. A filter restriction indicator shall be provided in the operator's station.
- G. The turbocharger in the exhaust system shall function as spark arrestor. Exhaust must be muffled and be routed to an overhead outlet inboard mounted on one limb riser. Flexible pipe sections must be stainless steel. Exhaust system shall be weatherproof and protect the engine from rainfall during idle periods. The top of the muffler must be protected, in such a manner, so as to keep water and other contaminants out of the muffler.
- H. A fuel-water separator with a spin-on replaceable element must be provided.
- I. Primary fuel filter must be vertically mounted.
- J. An electric engine hourmeter shall be provided. It shall be activated when the engine is running.
- K. All coolant hoses shall be protected by a fire and heat protective covering (Aeroquip AE102 or equivalent).
- L. Engine shutoff shall be controlled by an electric solenoid valve. The wiring to the solenoid shall be protected by firesleeve (Aeroquip AE 102 or equivalent).
- M. The cold weather starting aid shall be an electric engine block (coolant) heater. Ether start aid not allowed.
- N. Tractor must be equipped with a foot-operated decelerator.
- O. Engine must be equipped with a spin-on, vertical mount oil filter.
- P. Engine hood must be sealed around the exhaust and air intake pipes/ mounts so materials (pine needles, leaves, etc.) will not fall into engine compartment.
- Q. Emissions Control System must meet the following requirements:
 - 1. Machine must be fully certified to meet EPA Final Tier IV requirements.
 - 2. As long as the operator allows the machine to regenerate when required, the machine must be capable of "on the go" regeneration if regeneration is a part of the emission control process. The regeneration must not de-rate the capabilities of the machine in both passive and active regeneration.

30. DRIVETRAIN

- A. Transmission shall be hydrostatic drive. **Direct drive/Torque converter not acceptable.** Transmission must be capable of full speed direction changes.
- B. Infinitely variable ratios must be available in the hydrostatic drive system.
- C. Hydrostatic transmission must be dual path design. It must feature "load sensing," "anti-stall," and "counter-rotation." The tractor must be capable of

- "power turns." Turning radius must be consistent, even when travel speed is varied.
- D. Steering must be single lever, joystick controlled. The joystick must control forward and reverse motion, must control left and right steering & ground speed. It must also control counter-rotation. Speed control must be intergraded into the joystick.
 - E. The hydrostatic transmission must be plumbed with remote diagnostic test ports, conveniently located so as to permit diagnostic procedures without removal of any significant components.
 - F. A vertical mounted transmission oil filter with a spin-on replaceable element shall be provided.

40. UNDERCARRIAGE

- A. Track gauge will be no more than 70".
- B. Track shoes shall be center mounted, single grouser, 24" – 26" width. Maximum width, across the tracks, shall be no more than 95".
- C. Length of track on ground shall minimum of 90". Each track shall have a minimum of seven (7) track rollers.
- D. Ground pressure of the base canopy machine (without protection package, front winch, plow, etc) shall not exceed 5 psi.
- E. Track adjusters shall be hydraulic with covers over grease points to prevent inadvertent tightening. Recoil springs shall be covered. Recoil springs shall be heavy-duty versions, suitable for the maximum operating weight of the tractor and the operating conditions. Recoil system shall be equipped with over-pressure protection (relief valves in hydraulic track adjusters). A grease gun is to be provided.
- F. Each track shall have a minimum of one (1) carrier roller.
- G. Track chain shall be sealed and lubricated.
- H. Rollers & idlers shall be provided with lifetime lubrication.
- I. The roller frame suspension shall be rigid.
- J. Tracks shall have full length rock guards.
- K. All undercarriage components, including roller frames, idlers, rails, sprockets, rollers, and shoes shall be capable of continuous use per the defined application.
- L. Eight evenly spaced track shoes, on each side, shall have key-slots cut into them for self-retrieval. The key-slots must be sized for a ½" chain.
- M. Tractor shall come with warranted undercarriage.

50. CHASSIS

- A. Radiator grille must be rated for extreme service in forestry application. A quick released, hinged, heavy duty extreme-service grille must be provided.
- B. Engine side shields shall be hinged and/or quick release mounted. The engine compartment must be instantly accessible (both sides) without the

- use of tools. The hood and engine compartment side shields shall be perforated to the maximum extent offered by the manufacturer.
- C. A fuel tank shutoff valve shall be located within reach of the seated operator and must be operable without the use of tools. A steel fuel tank with a 50 gallons capacity, minimum shall be provided.
 - D. A fuel tank drain must be provided and protected from brush damage. It must be reasonably accessible with the use of tools, but without having to remove any major components.
 - E. All primary fuel lines must be metal or metal reinforced hoses. Hose connections shall be threaded with SAE or flat face o-ring connectors.
 - F. An electric fuel-priming pump must be provided.
 - G. Tractor must be equipped with a full length, extreme service bottom guard. Bottom guard must protect all components on the bottom of the tractor and have a thickness of no less than 12 mm. The bottom guard must include a bolt-on access hatch located at the lowest part of the guard for flushing out debris.
 - H. Front and rear tow hooks must be provided and accept ½" chain assemblies (including ½" chain hooks) through the opening.
 - I. Tractor must be equipped with a vandalism protection group. Fill points shall be lockable. Key alike padlocks shall be provided.
 - J. Tie down rings (2) shall be furnished on each roller frame. Rings shall be sized to meet federal transportation safety regulations and be located to minimize exposure to damage.
 - K. Ground clearance shall be a minimum of 13.0" as defined by the latest issue of SAE J1234.
 - L. Crawler must be equipped with a tank guard that protects both the fuel and hydraulic tank. It must be bolt on mount providing service access as needed.
 - M. Unit shall be equipped with outside tool box (es) located on the rear of the cab, above the winch or fireplow. It shall be the width of the cab, have a sloped top and not interfere with the operation of the winch or the remote hydraulic connections. Width and depth of the tool box(es) shall be great enough to allow hauling a drip torch, ½" chains and a 10 pound fire extinguisher.
 - N. All compartments must be sealed in order to keep as much debris and dirt out of them.
 - O. All outside latches will be protected by ½" minimum angle iron positioned on front facing side of the latch or pin.

60. HYDRAULIC SYSTEM

- A. Hydraulic pump shall be a variable flow or gear type with a minimum flow rate of 19 gpm. System pressure shall be 2800 - 3000 psi.
- B. Blade controls shall be on a single T-bar" control (lift, angle and tilt). Blade

- lift valve section shall include a float position.
- C. An auxiliary hydraulic circuit shall be provided for the rear-mounted fireplow. A separate lever and valve section shall be included. The circuit shall be equipped with a float position (lever forward) and one adjustable relief valve. The circuit shall connect to the plow via 1/2" breakaway couplers per the latest issue of SAE J1036. The couplers shall be located as close as possible to the center rear of tractor according to the latest issue of SAE J716.
 - D. All hydraulic tubing shall be prepainted or treated to prevent corrosion. It shall be securely mounted and protected to prevent damage and chafing.
 - E. Hydraulic hoses in the engine compartment or belly, within 12" of the bottom guard, must be covered with fire resistant sheathing, Aeorquip AE102, or equivalent.
 - F. Lift and angle cylinders must have steel guards.
 - G. All hoses routed to the blade, and all exposed hydraulic fittings must be adequately guarded for the intended application. If the option for the blade mounted winch is taken, the hydraulic hoses will run to the front of the crawler.
 - H. Blade cylinder rods are to be heat treated, chrome plated, ground and polished.
 - I. Steel hydraulic tank will be provided.
 - J. In the event of a broken hydraulic hose to any of the cylinders, oil must not leak from the broken hose as long as the control for that circuit remains in the neutral or hold position.
 - K. In the event of a broken hydraulic hose to any of the cylinders the machine must be able to travel a distance of 1 mile under its own power.

70. DOZER BLADE

- A. Dozer blade shall be mounted on an inside mounted, all hydraulic C-frame. Power lift, angle and tilt functions shall be provided. C-frame shall be "heavy duty" rated; suitable for the intended application.
- B. Dozer blade width shall be maximum of 105".
- C. Moldboard shall be equipped with bolt-on replaceable end bits and cutting edges.
- D. Dozer blade shall be equipped with a full width brush guard with angled corners, 15-18" high.

80. WINCH

Thirteen (13) tractors shall be equipped with a hydraulically driven winch mounted on the blade. The winch shall be equipped with a four-roller fairlead, incorporated into the structure of the blade brush guard. The winch shall have a nominal bare drum line pull of 20,000 pounds and a slow speed operation feature for retrieval operations. The winch must be supplied with a

5/8" x 80' wire rope, IWRC, XXIPS, 6 x 19 class. The cable strength and class construction must be suitable for severe forestry application. MFC will approve vendor supplying winch.

One (1) tractor will have a rear mounted winch with no plow. Winch will be min. 30,000 lbs slow speed. Power in, power out, free spool, brake-on and brake-off. Wire rope will be 3/4"x100', 6x19 class, IWRC, XXIPS with hook and tail chain. Fairlead will be four-roller. Caterpillar or John Deere are approved suppliers for this winch.

90. FIREFLOW

- A. Fireflow must be FESCO RM-1400H or approved equivalent.
- B. Fireflow safety latch (for the "up position") must be equipped with a mechanical latching mechanism to disable the latch. The intent is to prevent the latch from catching the plow each time it is raised to the uppermost position. The operator must be able to instantly enable or disable the latch from the operator's seat.

100. ROPS CANOPY & OPERATOR PROTECTION

This item will be the manufacturer's standard, full featured component of the crawler, which will include, but not limited to, the features described in the following:

A. Enclosed Cab

The operator's station shall be a fully enclosed, sound suppressed, ROPS cab. It shall be heated, air conditioned and pressurized. The Roll Over Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) shall meet the requirements of the latest issues OSHA 1910.266 and of SAE J1040 and J231, and be fully certified. Front and rear washer/wipers.

B. Windows

The windows will be made of safety material, which is rated, for extreme service for forestry application. Windows will have no more than 30% tint. It shall be heat resistant to no less than 480 degrees F. The window material shall be mounted in such a manner that the window will remain in place in the event of softening or melting of the window molding during a burnover occurrence. Protective screens meeting the requirements of SAE J1084 shall protect all windows. The screens shall be painted a non-glare color. All screens shall be 1/4" x 1-3/4" woven wire mesh or the equivalent cut plate. Each end of each strand shall be welded to the frame. Side, door, and rear screens are to be hinged to facilitate window cleaning. Front screen shall not

be hinged but removable. Knobs for securing the window screens shall be adequately guarded and retained on the screen frame when the screen is opened. Side screens are to be quick released, inside or outside operated, for an emergency exit.

C. **Operator Access**

The operator's compartment shall have left side and right side access doors. Operator compartment access must meet the requirements of SAE J1084. The doors of the operator's compartment shall be lockable to prevent unauthorized entry and operation of the machine.

D. **Seat and Seat Belt**

The operator's seat shall be a deluxe, full suspension seat with cloth cover. The seat belt shall be three inches (3") wide and retractable. The seat belt shall meet the requirements of SAE J386.

E. **Environmental Cab Cooling, Heating and Pressurizing System**

This cab will be the manufacturer's standard production cab with all the factory standard features. The heating and cooling modes will have the following minimum capabilities:

The operator's cab shall be cooled with an air conditioning system capable of 9,500 Btu/hr. The air conditioning system shall be R-134a compliant. The condensing unit shall be mounted on the rear of the cab and be equipped with maximum protection against damage from trees, tree limbs and brush. Condenser guard must provide easy access for servicing and cleaning unit without removal of the complete guard.

The pressurization system shall deliver air to the operator's compartment that has been filtered through a spark-arresting screen, a high efficiency particulate element (HEPA) and through an activated carbon element. The particulate media shall have an efficiency rating of 93 DOP at 0.5 micron. The media material shall be fiberglass. The activated carbon element(s) shall have an "Activity Rating" of 60, minimum. Any externally mounted filters shall be protected from brush damage. The pressurizer fan shall be rated at 400 CFM, minimum. Must provide six additional HEPA filters and six additional carbon filters.

The heater/defroster shall have a minimum capacity of 18,000 Btu/hr. The heating/cooling/pressurizing system shall conform to the requirements of SAE J1503/J1535D. An independent defroster fan shall be provided to defog the windows at any time, whether the system is being used for cooling

- or heating.
- F. Limb risers shall be of the point-to-point design and shall be constructed of square tubing not less than 3" x 3" x 1/4". One limb riser shall incorporate an inboard mounted, weatherproof exhaust.

110. ELECTRICAL SYSTEM

- A. Tractors with 12-volt electrical systems must be supplied with dual batteries (2, 12-volt batteries wired in parallel). Tractors with 24-volt systems must be supplied with two 12-volt batteries wired in series. Batteries shall be low maintenance design with a minimum of 190 minutes reserve capacity and at least 900 CCA each. A manual master electrical disconnect switch shall be provided.
- B. The alternator shall have a nominal capacity of at least 100 amps.
- C. Tractor shall be equipped with a minimum of six (6) work lights, paired as follows: One pair shall be mounted overhead, under the limb risers, facing forward. One pair shall be cab mounted at the most forward and widest portion of the cab roof. One pair shall be mounted inside the rear screen, facing rearward. Each pair of lights shall be switched on an independent circuit, using clearly labeled switches. Each circuit shall be protected by an independent, self-resetting circuit breaker. Lights shall be LED's and all shall be adequately protected from brush and tree contact and damage.
- D. The starting system can be either direct, electric or be keyless and be capable of accepting a security code.
- E. An electronic monitoring system shall be provided to monitor all internal operating systems. It shall include audible and/or visual alarms for the charging system, hydraulic and transmission filter restriction, engine coolant temperature, engine oil pressure, and air cleaner restriction. Gauges shall be provided for engine oil pressure and engine coolant temperature. A fuel level gauge shall be provided.
- F. An engine tachometer, suitable for diagnostic purposes, shall be provided.
- G. All critical electrical wiring and electronic sensors in the belly pan and engine area necessary for continued dozer operation shall be covered with fire sleeve. (Aeroquip AE 102 or equivalent)
- H. The tractor must be equipped with a GPS tracking and transmitting system that is capable of transmitting its location and critical operating conditions/parameters to a dealer network that can forward the information to the Mississippi Forestry Commission. Must function nationally.

120. WEIGHTS AND DIMENSIONS

- A. Operating weight of the tractor with the protection package, plow, winch, etc., shall be a maximum of 27,500 pounds.
- B. Overall machine height, including grouser height, shall be no more than 114".

130. SAFETY ITEMS

- A. The tractor must be equipped with a self-adjusting back-up alarm, per the latest issue of SAE J994, type A, 112 dB (A).
- B. The tractor must be equipped with a warning horn, per the latest issue of SAE J1105, type J, 117 dB (A).
- C. The service braking, secondary stopping and parking brake systems must meet the requirements of the latest issue of ISO 10265. Hydrostatic drive system must provide dynamic braking. Parking brake must be wet disk.
- D. The tractor shall be equipped with self-cleaning, anti-skid surfaces and hand grips as needed for safely mounting and dismounting the tractor and for all maintenance operations normally performed weekly, per the latest issue of SAE J185. Grab handles for mounting and dismounting shall be provided at each rear corner of the tractor.
- E. The tractor must be equipped with a convex mirror, mounted inside the operator's compartment. It must have a 26 square inch viewing area, minimum.
- F. At least one floorplate in the operator's compartment shall be quick release mounted for instant access without the use of tools for fire suppression in the belly pan. Minimum size of 10" x 10".
- G. The tractor shall be equipped with one five pound, ABC dry chemical fire extinguisher per the requirements of the latest issue of SAE J1212.
- J. The tractor shall be equipped with provisions to prevent unauthorized starting or movement of the machine, per the latest issue of SAE J1083.
- K. The tractor must conform to the latest issue of SAE J1212, Fire Prevention on Forestry Equipment.
- L. Safety signs shall meet the requirements of the latest issue of SAE J115.
- M. Water system for fire suppression: Tractor shall be equipped with a water system for the suppression of "belly pan" or brush fires. The system shall include a minimum of fifteen (15) gallon water capacity stainless steel tank, pre-mix foam capability, an electric pump capable of 5 gpm at 40-45 psi and a hand held brass adjustable nozzle with fifteen (15) feet of ½" recoil hose. The suppression system should be located either at the rear or in the cab of tractor.

140. PAINT

- A. The exterior of the tractor is to be painted (manufacturer's standard) industrial yellow.
- B. The brush screens and limb risers are to be a non-glare color.
- C. Interior of the cab is to be painted a non-glare color.
- D. Top of the cab (outside) is to be painted white.

150. CONDITIONS

- A. In addition to the equipment specified, the tractor shall be equipped with all standard equipment provided by the manufacturer for commercial or industrial use as specified in literature published by the manufacturer. The tractor shall comply with all federal and state safety regulations and standards.
- B. The supplier shall be responsible for delivering the tractor properly serviced, clean and in first class operating condition. Predelivery service, at a minimum, shall include:
 - 1. Complete lubrication.
 - 2. Check and fill all fluids.
 - 3. Verification of proper engine settings.
 - 4. Adjust tracks to proper tension.
 - 5. Check operation of all functions, gauges and accessories.
 - 6. Clean and remove unnecessary tags, stickers, marks, etc.
- C. Each tractor shall come with one Operators Manual and one Parts manual. The Vendor will supply four additional parts manuals and service manuals.
- D. Each tractor is to be completely assembled (unless noted otherwise in this specification), including options and attachments; thoroughly tested and ready for operation upon delivery.
- E. The manufacturer's warranty coverage must be, at a minimum, twelve (12) months full coverage, a manufacturer's five (5) year, 1500 hour, extended power train warranty and a 6 year 3000 hour undercarriage warranty shall be included. The "warranty effective date" shall be the date that the tractor is put into service by the Mississippi Forestry Commission. A copy of the warranty and a Manufacturer's Certificate of Origin are to be delivered with each invoice.
- F. Tractor Outfitting - All tractor outfitting shall be performed at an authorized facility, approved both by the tractor manufacturer and the Mississippi Forestry Commission.
- G. Four hours of operator training shall be provided for each tractor at each location. The training shall include operational, service and safety training.
- H. All crawlers will be delivered **90** days after Purchase Order has been received by winning bidder complete, per these specifications, to the Mississippi Forestry Commission's central maintenance facility located at 3139 Hwy 468, Pearl, MS.
- I. The Mississippi Forestry Commission estimated number of tractors being purchased at 14 units.

MISSISSIPPI FORESTRY COMMISSION
660 North Street, Suite 300
Jackson, MS 39201

14 One Hundred Four Horsepower (104 HP) LPG Class Bulldozer

(I) We, the undersigned, have read, understand and agree to bid in compliance with all Mississippi Forestry Commission specifications.

Make/Model _____

Bid Price each delivered: _____
104 horsepower dozer.

Company

Official Signature

Address

Contact Person

City State Zip

Business Phone

Email

Date

RFx # 3160000784